

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. - 3. (cancelled)

4. (currently amended) A method for manufacturing a semiconductor device, comprising the steps of:

forming a multilayer film including an insulation layer and either polycrystalline silicon or amorphous silicon on a semiconductor substrate;

forming a resist mask by patterning a resist applied on said multilayer film;

etching said multilayer film using said resist mask;

removing said resist mask after completing said etching; and

processing said semiconductor substrate to create a trench, having an upper end portion, utilizing said multilayer film having removed-from which said resist has been removed as a mask,

wherein said step of processing the semiconductor substrate includes providing a roundness to the upper end portion of the trench by adhering a reaction product composed at least of said semiconductor substrate and a reaction gas to side wall portions of said multilayer film.

5. (previously presented) A method for manufacturing a semiconductor device according to claim 4, wherein said multilayer film comprises at least a silicon nitride layer and a silicon oxide layer.

6. (previously presented) A method for manufacturing a semiconductor device according to claim 4, characterized in performing a desired round-off processing by controlling the reaction product, gaseous species, and gas flow rate to round off the upper portion or a bottom portion of said trench.

7. (currently amended) A method for manufacturing a semiconductor device, comprising the steps of:

forming a multilayer film including an insulation layer and either polycrystalline silicon or amorphous silicon on a semiconductor substrate;

forming a resist mask by patterning a resist applied on said multilayer film;

etching said multilayer film using said resist mask;

removing said resist mask after completing said etching; and

processing said semiconductor substrate to create a trench, having an upper portion, utilizing said multilayer film having removed-from which said resist has been removed as a mask,

wherein said step of processing the semiconductor substrate includes providing a round-off processing to the upper portion of the trench of said semiconductor substrate, using a reaction gas including hydrogen.

8. (previously presented) A method for manufacturing a semiconductor device according to claim 7, wherein said multilayer film comprises at least a silicon nitride layer and a silicon oxide layer.

9. (previously presented) A method for manufacturing a semiconductor device according to claim 7, characterized in performing a desired round-off processing by controlling the reaction product, gaseous species, and gas flow rate to round off the upper portion or a bottom portion of said trench.

10. (canceled)

11. (currently amended) A method for manufacturing a semiconductor device, comprising the steps of:

forming a mask layer having openings corresponding to element isolation regions on a semiconductor substrate;

etching said semiconductor substrate utilizing said mask layer as a mask using a mixed gas including CHF_3 and HBr , to form upper end portions of a trench in tapered shape; and

etching said semiconductor substrate utilizing said mask layer as a mask using a mixed gas including Cl_2 , O_2 and HBr to form a main trench portion,

wherein a desired round-off processing is performed by controlling etching time and bias voltage of the step of forming the tapered shape and the step of forming the main trench portion.

12. (new) A method for manufacturing a semiconductor device according to claim 11, wherein the ratio of mixed gas including CHF_3 and HBr is 1:5, and the ratio of mixed gas including Cl_2 , O_2 and HBr is 5:1:20.

13. (new) A method for manufacturing a semiconductor device according to claim 4, wherein the reaction gas includes a halogen system gas selected from the group consisting of CHF_3 , CxFy , F_2 , HF , Cl , HCl , HBr and HI .

14. (new) A method for manufacturing a semiconductor device according to claim 7, wherein the reaction gas includes a halogen system gas selected from the group consisting of CHF_3 , CxFy , F_2 , HF , Cl , HCl , HBr and HI .